GRAND LAKE ST. MARYS & ITS WATERSHED: WATER QUALITY IMPROVEMENT INITIATIVES

Ohio Department of Natural Resources
Ohio Environmental Protection Agency
Ohio Department of Agriculture
Ohio Department of Health

Mercer and Auglaize SWCDs
Natural Resources Conservation Service
Other Public and Private Partners

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Introduction

Grand Lake St. Marys (GLSM) is Ohio's largest inland lake at 12,700 acres. Straddling the Auglaize-Mercer County line between St. Marys and Celina, the lake was constructed in the mid-1800s to store water for the Miami-Erie Canal. Today, GLSM is a popular recreational lake, which draws thousands of visitors to the area each year. This vital community resource also serves as the drinking water supply for the City of Celina.

Over the years, the lake has become increasingly enriched by various forms of phosphorus and nitrogen from a number of man-made and natural sources. These nutrients have contributed to the decline of the lake's water quality.

In 2007, the Ohio Environmental Protection Agency (OEPA) participated in a national study of water quality conditions in lakes across the United States by collecting sampling data in GLSM and 18 other Ohio lakes. Laboratory analysis included testing for the presence of the algal toxin, microcystin. OEPA received lab results for microcystin levels on April 27, 2009. The level of microcystin recorded in Grand Lake St. Marys was very high compared to the other lakes sampled. OEPA conducted more extensive follow-up sampling, which confirmed the levels of microcystin throughout the lake exceeded the World Health Organization provisional guideline value for moderate risk associated with recreational contact.

In response, OEPA, the Ohio Department of Natural Resources (ODNR) and the Ohio Department of Health (ODH) issued warnings to state park visitors to exercise caution if they have contact with water in the lake. Additionally, ODNR, OEPA, Ohio Department of Agriculture (ODA), U.S. Department of Agriculture (USDA) and local organizations immediately began discussions to determine ways to address the situation.

As part of these discussions, ODNR's Division of Soil and Water Resources began reviewing its current authorities with respect to its Agricultural Pollution Abatement Program (since the majority of solving this and related water-quality issues at GLSM hinges in large measure on proper nutrient management in the watershed). In addition, ODNR and OEPA identified other in-lake, near shore, and tributary channel actions that will also help improve lake health.

Below are results from the reviews and discussions and recommendations to address excessive nutrient loading to GLSM, including that from agricultural sources, especially those associated with animal feeding operations. Because excessive nutrient levels also originate from other sources, there are additional recommendations that relate to those sources. Other recommendations relate to potential in-lake work, especially near public recreation areas. Also noted is the need for continued monitoring of watershed and lake water quality, delivery of pollutants to the lake, and implementation of conservation practices and other improvement measures. Plans are also identified for additional scientific and technical assessments of "cause and effect" related to lake and watershed conditions, and to solutions.

It's important to note that the following recommendations build upon widespread implementation of agriculturally-related and other non-point source conservation practices. The recommendations will serve as an important implementation vehicle for the ODNR/OEPA-endorsed, locally-developed, 2008 GLSM Watershed Action Plan, which is also key to improving the lake's water quality. Because this effort must truly be a cooperative one, with all local, state and federal partners working together to implement these collaborative recommendations; it is proposed that the Advisory Board for the Grand Lake Wabash Watershed Alliance serve as a principal means to facilitate the desired and necessary coordination for stakeholders and partners.

The recommendations below are organized according to three main categories:

1. **Outreach, engagement and voluntary implementation without significant additional resources**
2. **Enforcement with current resources and authority**
3. **Efforts with significant increases in resources**

The state recognizes that there are many challenges to protect, manage, and restore GLSM and its watershed. But the enormous economic, social and environmental values represented by the lake and the watershed, clearly argue that all parties must continue to work together toward common goals. The State of Ohio shares those interests and goals and we are committed to join partners in attaining them.

This organization emphasizes that much can be done by effectively focusing current resources and programs, both public and private, to solve water quality and related issues at Grand Lake. However, even more could be done if the identified program delivery tools and incentives could be implemented.

*****A note about agriculture in the Grand Lake watershed***

It is the state's view that the majority of nutrient runoff from agricultural sources being transported to Grand Lake from the watershed's approximate 450 farms, approximately 300 of which have livestock and/or poultry, results from land application of manure and commercial fertilizers (not necessarily spills, storage pond failures or blatant rule violations). Migration of nutrients off farm fields and into waterways is usually not discernible to the eye and the producer or operator is likely not knowingly or intentionally over-applying. Consequently, we believe that investing time and resources into better overall nutrient management in field applications, balancing agronomic and environmental needs, as well as supporting alternatives to land application are the most productive areas on which to focus.

RECOMMENDATIONS

Outreach, Engagement and Voluntary Implementation without Significant Additional Resources

Agriculturally Related Issues:

The majority of the land in the Grand Lake watershed is in agricultural production. Crop and livestock production accounts for approximately 90% of the land in the watershed. To that end, the following recommendations are proposed to address recognized concerns regarding agricultural pollution sources with existing staff.

- Transfer 1 FTE from within DSWR to work full-time within the GLSM watershed to assist with tasks such as but not limited to:
  - Increase technical assistance and site visits to farms (visit 50 operations).
  - Improve complaint follow-up visits; conducting enforcement.
  - Conduct nutrient management plan (NMP) training (4 workshops).
  - Outreach to producers, integrators, co-ops, ag organization members, etc.
  - Liaison with local USDA reps to accelerate use of Farm Bill conservation funds.

- Engage local chapters of OFBF, OFU, Young Farmers, and other agricultural organizations; seek commitment that all of their crop and livestock farming membership develop and use NMPs – either the new streamlined Ohio Nutrient Management Workbook, or a full NRCS Comprehensive Nutrient Management Plan (CNMP); ask for their help in conducting NMP training and on-farm assessments.

- Engage local co-ops and integrator companies; seek their commitment that all of their partners and producers develop and use NMPs; ask for their help in conducting training.
  - Apply for Cooperative Conservation Partnership Initiative (CCPI) grants to assist in nutrient management plan development in 2010.

- Organize and conduct NMP training sessions through DSWR and SWCDs in late 2009 and early 2010; all producers in the watershed will be given the opportunity to attend; goal is to reach over 90% of all farms (row crop and livestock) within two years. Training will inform that NRCS CNMP is required for EQIP eligibility.

- Foster the use of manure nutrients over commercial fertilizer.
  - Encourage producers to acknowledge manure nutrients applied, and reduce or eliminate commercial fertilizer application.
  - Supply nitrogen needs for corn through side dressing swine manure on 500 acres in 2010.
  - Supply nitrogen needs for wheat through top dressing swine manure on 100 acres in 2010.

- Foster efforts to export more manure from the watershed.
  - Document extent to which poultry manure is exported from the watershed over the next nine months; assist in raising the already-high percentage.
  - Apply for funding to continue research using Geotubes for manure solids separation and nutrient concentration over the next year.
  - Help facilitate a study to determine the distance swine manure can be trucked economically.

- Collaborate with USDA NRCS on the use and prioritization of Farm Bill programs including Environmental Quality Incentives Program (EQIP), at a level of at least the FFY '09 and '10 of ~$1 million/year (contingent upon future federal appropriations), in an effort to:
  - Develop and/or update 50 CNMPs in the next year.
  - Promote new 'bundled' land management practices available, and work with NRCS to identify and tailor a package of practices that better fit the GLSM watershed, with a goal that 1000 acres be managed under "bundled" practices.

- Install 20 manure storage and management structures in 2009 and 2010.

- Increase conservation practice enrollment in the Conservation Reserve Program and the Lake Erie Conservation Reserve Enhancement Program within the Grand Lake watershed.
  - Establish 65 acres of filter areas or riparian buffers within the Grand Lake watershed at an average width of 30 feet within five years.
  - Construct or restore 60 acres of functional wetlands within five years to allow for filtration of nutrients and settling of sediment.

- Assist USDA NRCS with conducting farm-scale conservation planning and targeting BMP implementation in two priority sub-watersheds within the GLSM watershed: Beaver/Coldwater Creek and Grassy/Monroe Creeks. NRCS will also provide outreach and educational activities with local stakeholder groups and organizations. This project expects to accomplish development of conservation plans on 35% of acreage in both sub-watersheds during FFY '10. By FFY '11 the project will emphasize enrolling and installing BMPs, including more effective, and targeted buffer installation, wetland restoration, drainage water management, as well as other traditional EQIP practices. This initiative is funded with Clean Water Act Section 319 funding from Ohio and US EPA and will result in:
  - Complete farm-scale conservation plans on 35% of the acreage within the two targeted sub-watersheds.
  - Enroll and install conservation BMP's on 35% of the acreage within the two targeted sub-watersheds.

- Pursue the use of other grants from USDA, US EPA, etc.
  - Coordinate with OSU Extension and apply for Conservation Innovation Grant to develop manure management and cover crop management strategies in the next year.
  - Identify other grants and funding sources to improve nutrient management in the watershed.

- Establish management practices and obtain buy-in from interested parties to improve fall/winter manure management.
  - Encourage producer compliance with Ohio NRCS 633 Waste Utilization Standard, Ohio NRCS 590 Nutrient Management Standard, and Ohio NRCS 313 Waste Storage Facility Standard.
  - Significantly reduce manure applications on frozen or snow covered ground and within four years eliminate producer dependency on application of liquid manure on frozen or snow covered ground in the GLSM watershed.
  - Establish cover crops after manure application in order to keep manure nutrients in the field and prevent losses.
  - Some operations may be able to eliminate dependency on frozen/snow-covered ground without incentives, while others may need assistance with manure storage or other alternatives.

- Identify and pursue development of alternative manure treatment and management strategies.
  - Coordinate with OSU Extension to develop land treatment practices to treat fields with extremely high soil test phosphorus with alum over the next 18 months.
  - Help facilitate development of networks between producers with excess manure and producers buying commercial fertilizer, in an effort to replace fertilizer with manure, possibly through OFBF and other agricultural organizations within two years.
  - Help develop management strategies and identify application equipment that allow producers to make manure applications on growing crops.
  - Explore implementation of methane digesters or gasification technologies to improve manure management and reduce carbon emissions, with the City of Celina and others
  - Develop strategies to employ separation

of manure solids, and work to export separated solids from the watershed.

- Re-establish natural watershed buffers and channels (ag and non-ag applicability).
  - Identify areas for development of streamside wetlands and willing landowners for implementation.
  - Identify channels with impaired drainage, and explore alternative channel designs to restore natural channel processes that reduce nutrient and sediment delivery.
  - Explore innovative ways to use existing programs to achieve buffer installations
  - Identify the most environmentally-effective locations for filter areas.

Non-Agriculturally Related Issues:

While representing the majority of the land use in the watershed, agriculture is not the only source of pollution in the watershed. The following items have been identified as areas to engage partner agencies and other organizations in the community to address non-agricultural pollution sources.

- Seek to upgrade treatment and control of domestic sewage.
  - Assist SWCDs applying for EPA Sect. 319 funds to repair failing septic systems in 2009 and assist Mercer and Auglaize counties to use American Recovery and Reinvestment Act funding available for same purpose.
  - Document current and planned development of central sewer systems and assist residents in connecting to those systems.
  - Coordinate with Mercer and Auglaize County Health Dept to identify and gauge extent of failing household sewage treatment systems.
  - Develop additional funding options to assist in system replacement, rehab, or central system connections.
- Increase assistance, oversight and enforcement of sediment & erosion control plans on development sites.
  - Provide outreach and training to developers and contractors for pre- and post-construction stormwater management and erosion control.
  - Coordinate among local and state agencies to ensure compliance with stormwater and erosion and sediment control standards.
- Working in partnership with Ohio EPA, ODNR, US EPA-Region 5 and local partners, US EPA- funded technical consultants will develop a lake management and implementation strategy to identify and implement site-specific recommendations for lake management practices to improve water quality within Grand Lake. The strategy will also identify and implement actions designed to reduce harmful algae blooms within recreational areas of the lake.
- Recreational facility management and water quality improvement: Working in cooperation with Ohio EPA, GLSM State Park and other local recreational management partners, identify and install lake management practices designed to improve water quality in and around public recreational areas in GLSM. An outline of potential projects that may be effective includes:
  - Lake shoreline stabilization
  - Channel aeration and/or circulation
  - Alum treatment demonstration projects
  - In-stream alum doser demonstration project to reduce nutrient loadings
  - Solar powered circulators in and around beach areas to reduce blue-green algae
  - Lake management outreach and education
- Preserve and restore wetlands.
  - Identify remaining wetlands around GLSM to protect and areas where wetlands could be most effectively restored, to reduce sediment and nutrient delivery; protect 30 acres of existing wetland and restore an additional 30 acres.
- Reduce non-ag nutrient applications.
  - Provide workshops on lawn fertilizer and

other urban water quality BMPs.

- Educate homeowners close to the lake of the fate of lawn fertilizers applied and reduce over-application of such fertilizers.

- Conduct water quality monitoring and public information.
  - Coordinate ongoing water quality monitoring and microcystin analysis with Ohio EPA, ODNR, Celina and others.
  - Conduct public education and outreach regarding water quality and potential impacts of blue-green algae in coordination with the Ohio Department of Health. ODH will assist with the development and distribution of advisory information.
  - Maintain a GLSM website or content and links to existing websites to provide public information about water quality.

Enforcement with Current Resources and Authority

- Reach agreement with Mercer and Auglaize SWCDs, ODA, and ODNR DSWR that, with current resources:
  - All partners will continue to vigorously respond to all complaints.
  - Valid complaints resulting in pollution of waters of the state that are not resolved within six months will be referred to DSWR for enforcement; any orders will include NMP requirement.
  - Documented ag pollution abatement program rule violations will be monitored for any further repeat violations for four years. A second violation within this timeframe will result in an immediate referral to DSWR for enforcement action; any Chief's Order that is issued will require an NMP to be developed.
  - ODNR Chief will consider referring repeat violators to ODA for possible permitting, as well as referrals to Ohio's NPDES authority.

Potential Efforts with Significant Increases in Resources (sources to be determined)

- Promote and offer incentives for implementing NMPs.
  - $500,000 could pay NMP implementation incentives on the entire lake watershed, assuming an annual incentive payment of $10/acre.
  - With 300 livestock and 450 total farms, an estimated 4 additional FTEs are needed to conduct site visits and confirm plans are being followed and provide further assistance and follow-up annually.
  - Note: a full Comprehensive Nutrient Management Plan (CNMP) is necessary to be eligible for NRCS EQIP programs, rather than the Ohio streamlined NMP.

- Foster use and adoption of winter cover crops with incentives for use after manure application to help meet land application standards.
  - With a goal of converting 15% of the available acres, and an incentive rate of $30/acre, costs would be ~ $225,000 annually.

- Some operations are able to eliminate dependency on frozen/snow-covered ground without incentives, while others may need assistance constructing manure storage or developing other alternatives. It is estimated that 40 manure storage structures would be required to eliminate reliance on winter application practices with incentives of ~ $2,000,000 important to achieve this.

- Explore the development of a program similar to American Farmland Trust's BMP Challenge (insurance against lower net revenues when lower manure/fertilizer application rates are followed).
  - Assuming 300 farms participate with 50% experiencing $25/acre loss, resulting costs would be $375,000 annually.

Additional Recommendations

Beginning in 2008, the Division of Soil and Water Conservation convened agricultural organizations, commodity groups, environmental organizations and local, state and federal agencies to form the Agricultural Pollution Abatement Advisory Committee. The Advisory Committee examined the Division's Agricultural Pollution Abatement Program in order to advance recommendations for strengthening the program's effectiveness. By June 2009, the Advisory Committee issued its Report and Recommendations after extensive discussions regarding manure management planning and site assessments, promotion of cost effective manure management, and how the program might leverage current enforcement authority to more efficiently handle agricultural pollution complaints.

It is recommended that all stakeholders - landowners, industry representatives, commodity groups, farm organizations, state legislators, environmental organizations, Soil and Water Conservation Districts, and state and federal agencies-continue to work together and explore ways in which the recommendations of the Advisory Committee can be implemented in the Grand Lake St. Mary's watershed.

A copy of the Agricultural Pollution Abatement Advisory Committee's Report and Recommendation can be downloaded at http://ohiodnr.com/AgPollAbRpt.pdf

To obtain a hard copy, please call the Division of Soil and Water Resources at (614) 265-6610 or write to the Chief of the Division of Soil and Water Resources, 2045 Morse Rd., Building B3, Columbus, OH 43229.